Space Weather Forecast

Issued on Thursday, 18 January 2024 at 12:03 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Now-reduced daily chance of isolated Moderate-class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was low over the last 24 hours. Occasional low to mid-ranking Common-class X-ray flares were observed, peaking at 18/0408UTC from a region just east of the middle of the facing side of the Sun.

There were up to nine sunspot regions on the facing side as of the current UTC morning, with two rotating into view over the eastern solar horizon. The main sunspot region changes in the period were seen the development of intermediate spots in a region in the southeast, although this did not culminate in significant flaring.

While some minor Coronal Mass Ejections (CMEs) were visible on satellite imagery in the past 24 hours, none of these are though to bear Earth-directed components.

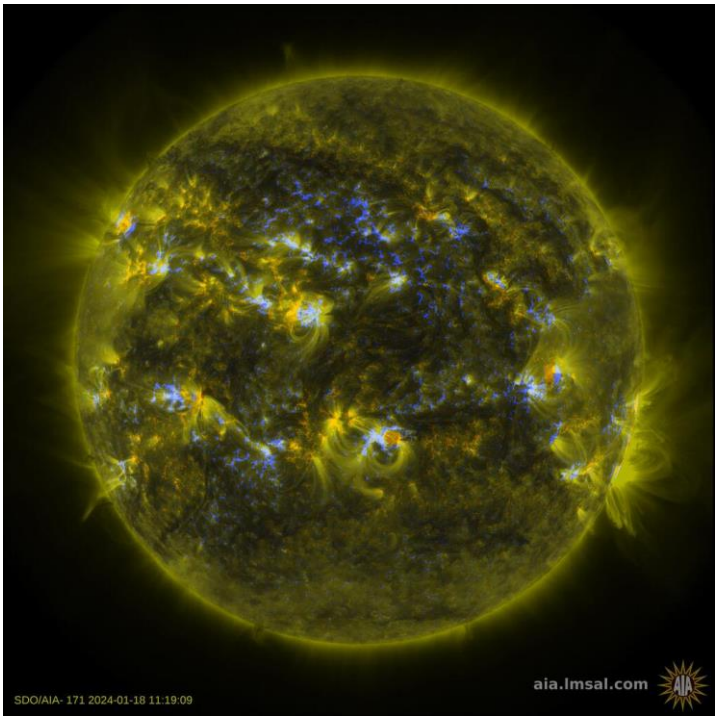

Figure 1: Extreme UV image of the Sun showing a proxy for mangetic field lines (yellow arcs) emanating. Also shown are areas of opposing magnetic field (blue versus orange), with these more concentrated in the sunspot regions themselves (e.g. as seen on the solar horizon lower right).

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Solar Wind / Geomagnetic Activity: Solar winds were within background levels, however the prevailing slow regime did show characteristics of a minor enhancement after 18/0300UTC. The magnetic field associated with the solar wind increased from background to a slightly elevated peak after 18/0300UTC, with the north-south component varying between being co-aligned and anti-aligned with Earth's field (to lesser or greater geomagnetic effect respectively). The solar wind speed showed an initial slight waning tendency, before regaining and surpassing lost ground after 18/0300UTC.

The cause of this enhancement is uncertain - it is either the very overdue fast wind from a weak coronal hole now nearing the western solar horizon, or else a very minor un-forecast CME. whatever the mechanism, the result on geomagnetic activity was very muted - remaining quiet throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a now-reduced daily chance of Moderate X-ray activity, although the hint of a very gradual increase towards a more typical 'climatology' over the four days is maintained.

Solar Wind / Geomagnetic Activity: No CMEs feature in the forecast. There is perhaps one remaining stream of fast wind in the forecast, that from a northern hemisphere 'coronal hole' near the middle of the Sun which remains posited for Saturday 20 January arrival.

Mainly quiet geomagnetic activity is expected through the tail of the UTC working week, perhaps increasing to a slight chance of Minor Geomagnetic Storm G1 on Saturday 20 January, waning over the remainder of the weekend.

Energetic Particles / Solar Radiation: There is a flat daily slight chance of minor solar radiation storms occurring (S1) with no complex sunspots currently in favourably-connecting parts of the Sun, and no recent significant flares.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

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X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	25	25	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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